SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F21-R-47

Name: East Lemmon Lake (a.k.a. Lemmon State Lake) **County:** Perkins

Legal description: Sec 16 & 21, T 21N, R 17E
Location from nearest town: 11 mi. S. 7 mi. E Lemmon, SD
Dates of present survey: June 23-25, August 25, 2014
Date last surveyed: June 17-18, October 1, 2013
Management classification: Warmwater semi-permanent

Primary Species: (game and forage)	Secondary and other species:
1. Largemouth bass	1. Whiter sucker
2. Yellow perch	2. Black bullhead
3. Northern pike	3. Golden shiner
4.	4. Smallmouth bass

PHYSICAL CHARACTERISTICS

Surface Area: 165 acres **Watershed:** 49,500 acres
Maximum depth: 16 feet **Mean depth:** 8.5 feet
Lake elevation at survey (from known benchmark): lake was at full pool

Ownership of lake and adjacent lakeshore property:

East Lemmon Lake is owned and managed by the South Dakota Department of Game, Fish and Parks. The dam structure and a small portion of the lake are located on private land.

Fishing Access

Fishing access is excellent for boats with a large, new concrete ramp and a large dock for launching. Shore fishing is very limited by heavy vegetation around the entire lake.

Observations of Water Quality and Aquatic Vegetative:

Cattails and bulrush comprise much of the shoreline and littoral areas. During mid to late summer large mats of submergent vegetation are present throughout the lake. Water quality has not been test by department personal but appears to be good.

Observations on condition of structures, i.e. (spillway, level regulators, boat ramps, etc)

The spillway at East Lemmon Lake developed a cavity during the spring of 1995. A temporary repair of the badly damaged structure occurred in the fall of 1997. In the fall of 2000, a full repair of the dam including intakes, tubes and spillway was completed. The cost of the project at completion was $147,198. East Lemmon Lake has a new boat ramp with a boat dock.

BIOLOGICAL DATA

Sampling Effort and Catch

Trap nets and experimental gill nets were used on June 23-25, 2014 to sample adult fish populations in the reservoir (Figure 1). The net sampling consisted of eight trap net nights and two gill net nights. The catch data is displayed in Tables 1 and 2.

Night electrofishing was used on August 25, 2014 to sample the largemouth and smallmouth bass population. Five, 10-minute sites were accomplished during the survey and catch data is summarized in Table 3.

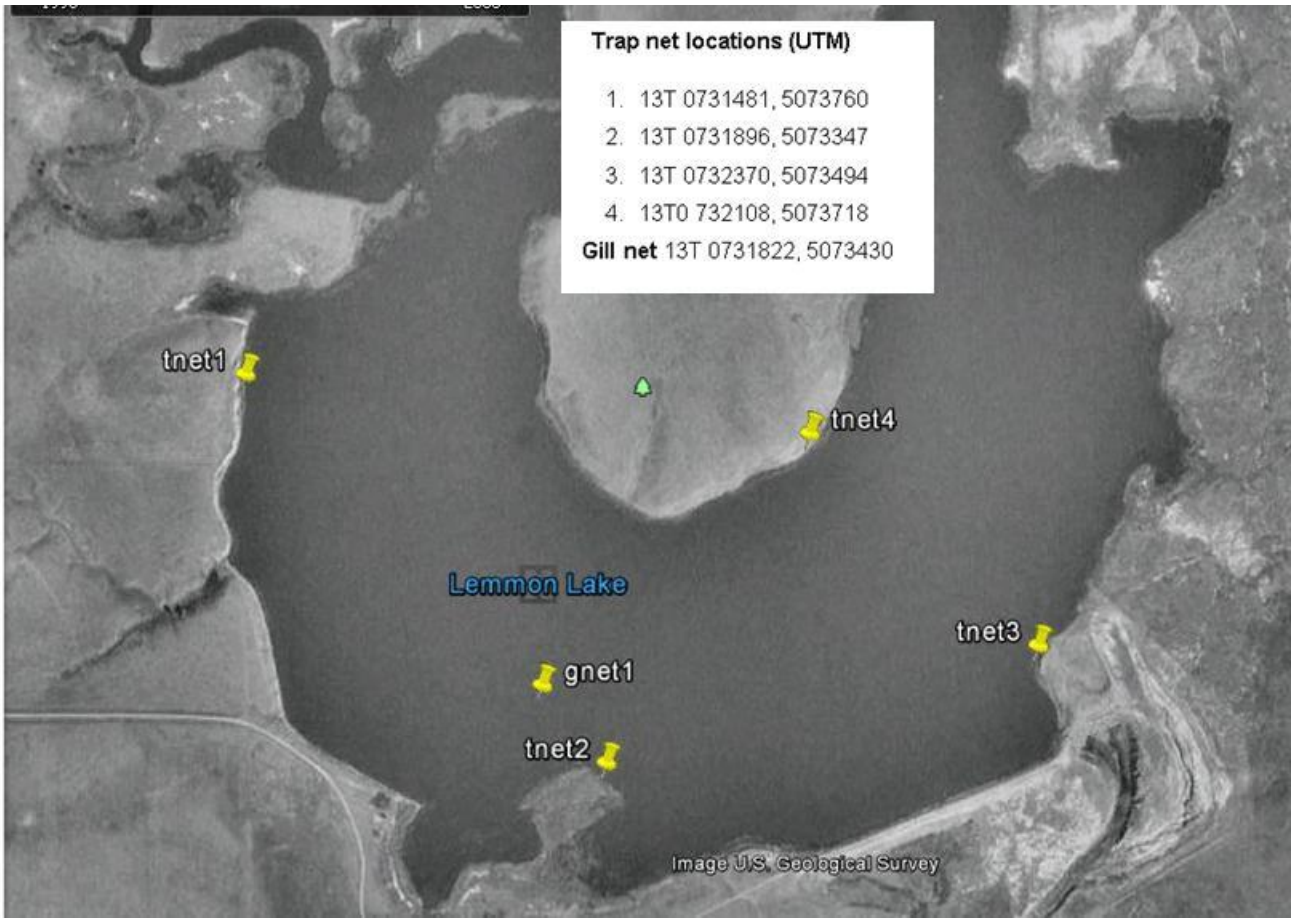

Figure 1. Net locations with GPS coordinates from the 2014 survey on East Lemmon Lake.

Table 1**.** Catch data from all species collected in eight trap nets in East Lemmon Lake, Perkins County, June 23-25, 2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	*Wr*≥S
Black bullhead	1,126	140.8 (32.6)	140.8 (32.6)	86 (2)	0	82.7 (1.2)
Largemouth bass	7	0.9 (0.4)	0.3 (0.2)	--	--	108.2 (33.4)
Northern pike	1	0.1 (0.2)	0.1 (0.2)	--	--	83.9 (--)
White sucker	29	3.6 (0.7)	3.6 (0.7)	100	100	90.5 (1.5)
Yellow perch	9	1.1 (0.7)	1.1 (0.7)	100	44 (33)	99.3 (2.7)

Table 2**.** Catch data from all species collected in two gill net in East Lemmon Lake, Perkins County, June 23-25, 2014. CPUE's with 80% confidence intervals in parentheses. PSD, PSD-P and *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	*Wr*≥S
Black bullhead	223	111.5 (112.3)	111.5 (112.3)	72 (5)	0	83.4 (1.9)
Northern pike	3	1.5 (1.5)	1.5 (1.5)	--	--	99.9 (26.1)
White sucker	6	3.0 (3.1)	3.0 (3.1)	--	--	95.5 (1.5)
Yellow perch	42	21.0 (9.2)	21.0 (9.2)	86 (9)	31 (12)	106.3 (1.4)

Table 3. Catch data from night electrofishing at East Lemmon Lake, Perkins County, August 25, 2014. CPUE's with 80% confidence intervals in parentheses. *Wr* with 90% confidence intervals in parentheses.

Species	N	CPUE	CPUE-S	PSD	PSD-P	*Wr*≥S
Largemouth bass	107	128.4 (42.9)	90.0 (43.1)	7 (5)	3 (3)	121.3 (0.2)
Smallmouth bass	1	1.2 (1.8)	1.2 (1.8)	--	--	96.4 (--)

Black bullhead

Black bullheads were the most abundant fish captured in the trap nets and gill nets. Last year, CPUE in trap nets was 187.3, compared to 140.8 this survey (Table 1). The gill net CPUE was 111.5, compared to a catch of 102.0, last year (Table 2). Size structure has increased with PSD for the trap net sample at 86 this year, versus 11 in 2013. Although no growth analysis was done the length frequency suggests good growth from last year to this survey (Figure 2)

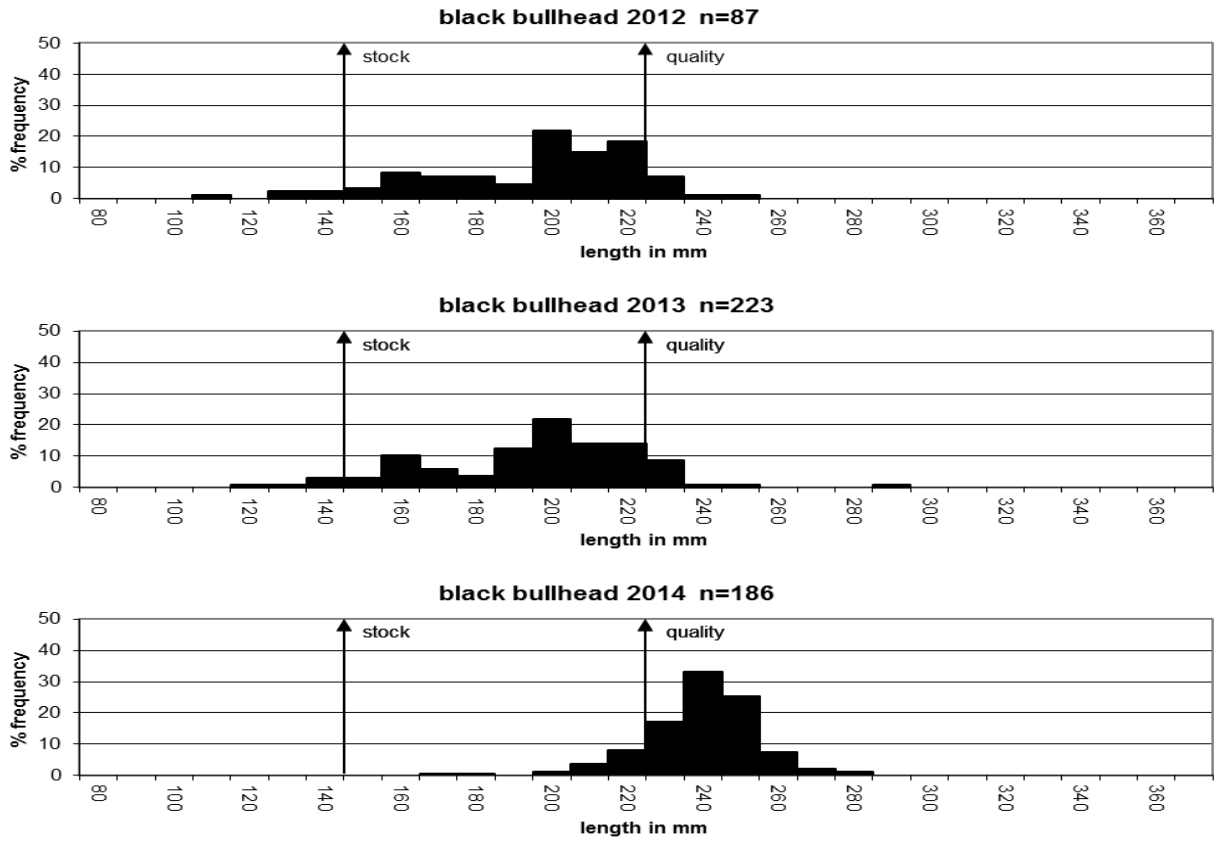

Figure 2. Length frequencies of black bullheads collected in trap nets from East Lemmon Lake, Perkins County, 2012-2014.

Largemouth bass

After low water and a winterkill in 2009, 6,000 largemouth bass fingerlings were stocked in 2010. Another 7,000 fingerlings were stocked in 2011. The electrofishing survey in 2012 yielded a CPUE of 336 largemouth bass per hour with a PSD of 8. Last year the thirty minute electrofishing survey had a CPUE of 8.0 fish per hour, though many age-0 fish were observed. It appears last year's fish made it through the winter as CPUE was 128.4 bass per hour this survey (Table 3). Stock indices remain low with a PSD of 7. Fish condition was excellent for stock length and larger fish with a *Wr* of 121.3. Length frequencies show continued variability in survival and recruitment with apparent age classes disappearing often or not recruiting to the adult population (Figure 3), probably due to winterkill.

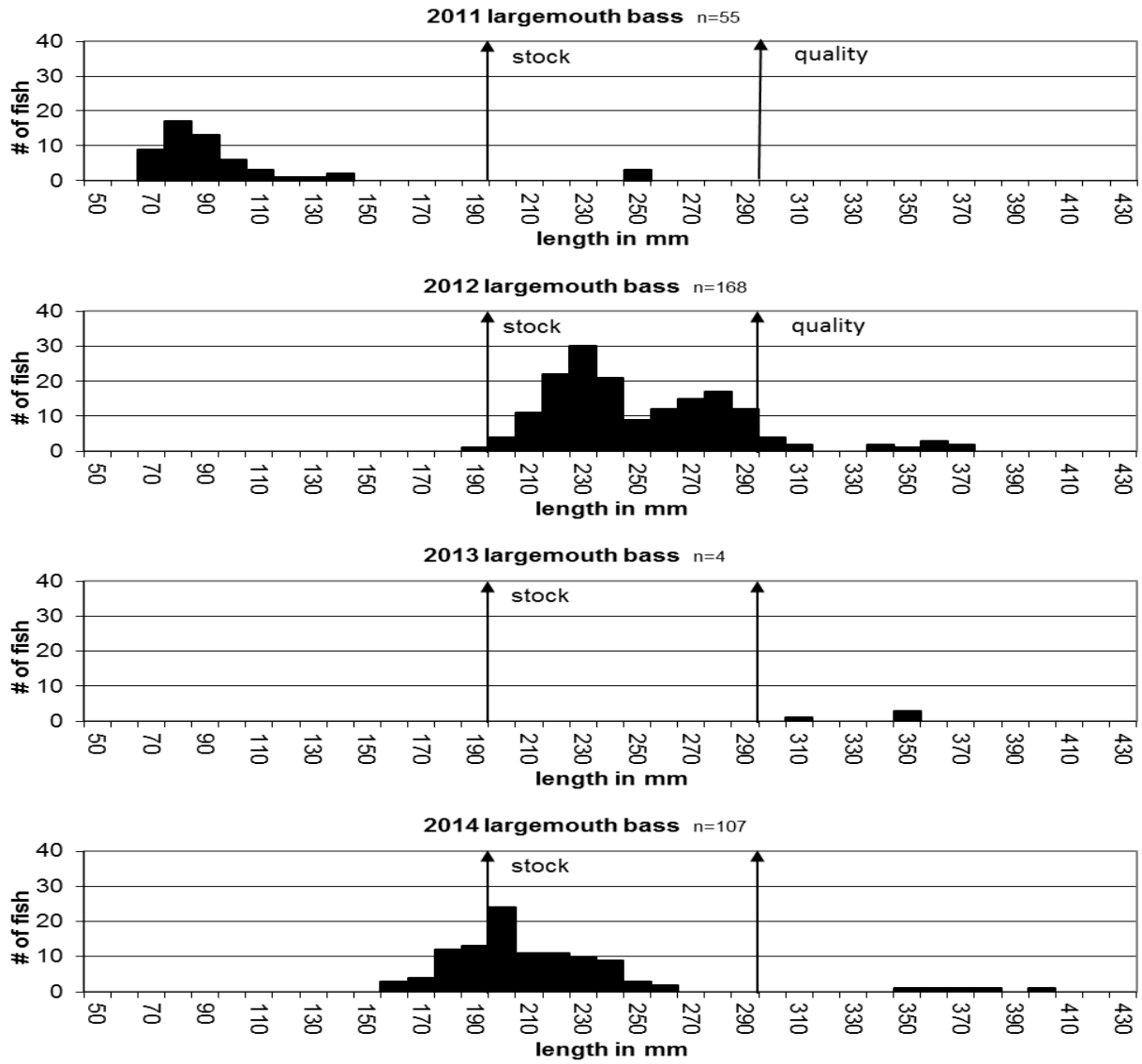

Figure 3**.** Length frequencies of largemouth bass collected from East Lemmon Lake, Perkins County, 2011-2014.

Northern pike

With the East Lemmon Lake fishery experiencing frequent winterkills, northern pike fry were stocked in the spring of 2010 to establish a fast growing fish that could create a quality fishery before the next winterkill. During the 2012 survey, the gill net caught two, while the trap net catch per net was 0.8. In 2013 the gill net caught three northern pike and the trap nets didn't sample any. This year the trap nets sampled one and the gill nets caught three. During fall electrofishing, numerous young of year northern pike were observed, indicating some natural reproduction did occur in 2014. However, the length frequency histogram indicates the low density population is experiencing no recruitment at this time (Figure 4).

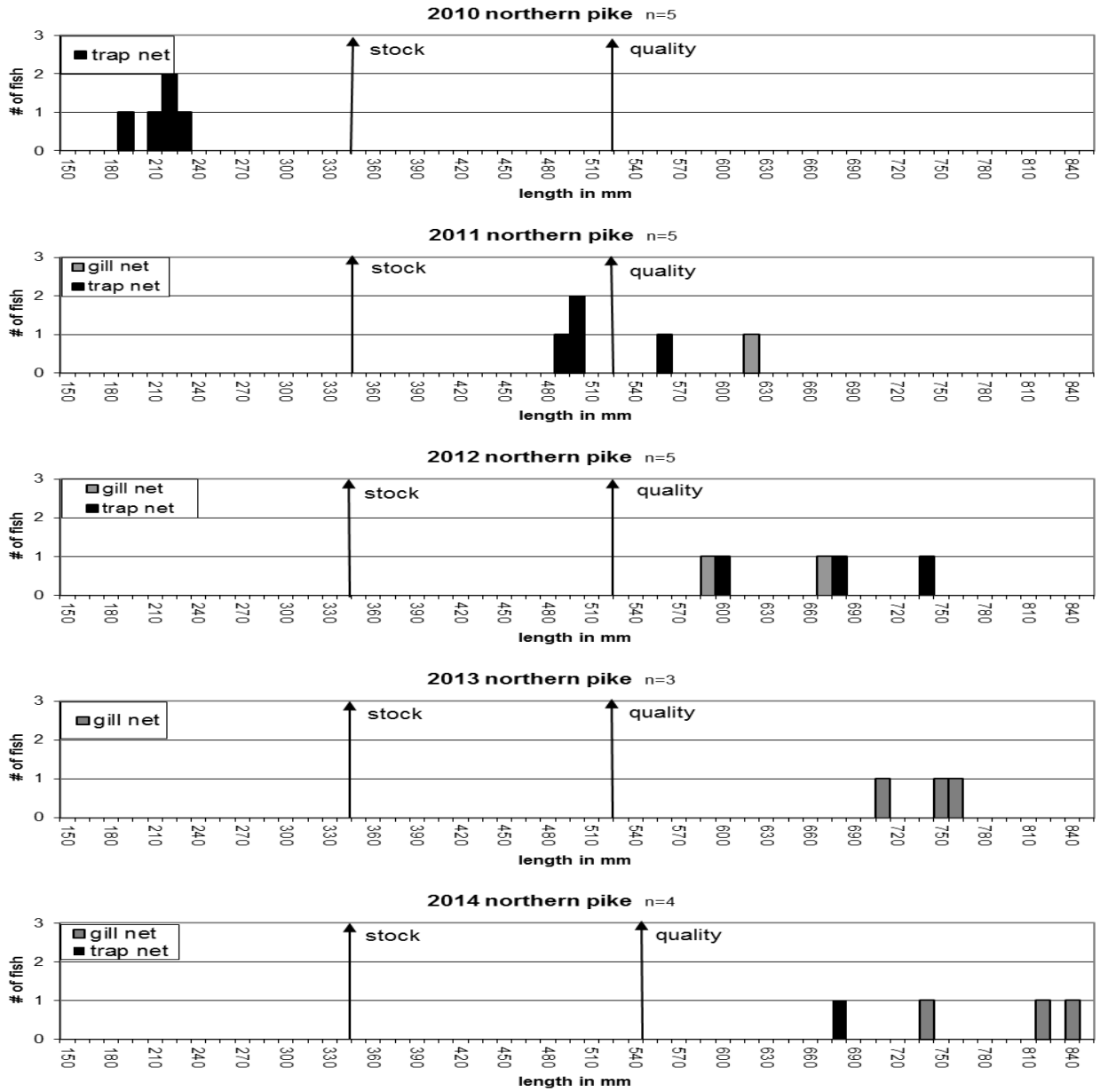

Figure 4. Lengths of northern pike collected in trap nets from East Lemmon Lake, Perkins County, 2010-2014.

White sucker

The white sucker density has decreased with a trap net CPUE of 3.6 and a gill net CPUE of 3.0 (Tables 1 and 2). Last year, the trap net CPUE was 15.7 and gill net CPUE was 19. The population appears to be dominated by a single year class which can be seen in the length frequency histograms over the past three years (Figure 5). It appears the predatory fish species of East Lemmon are keeping white sucker recruitment low and abundance in check.

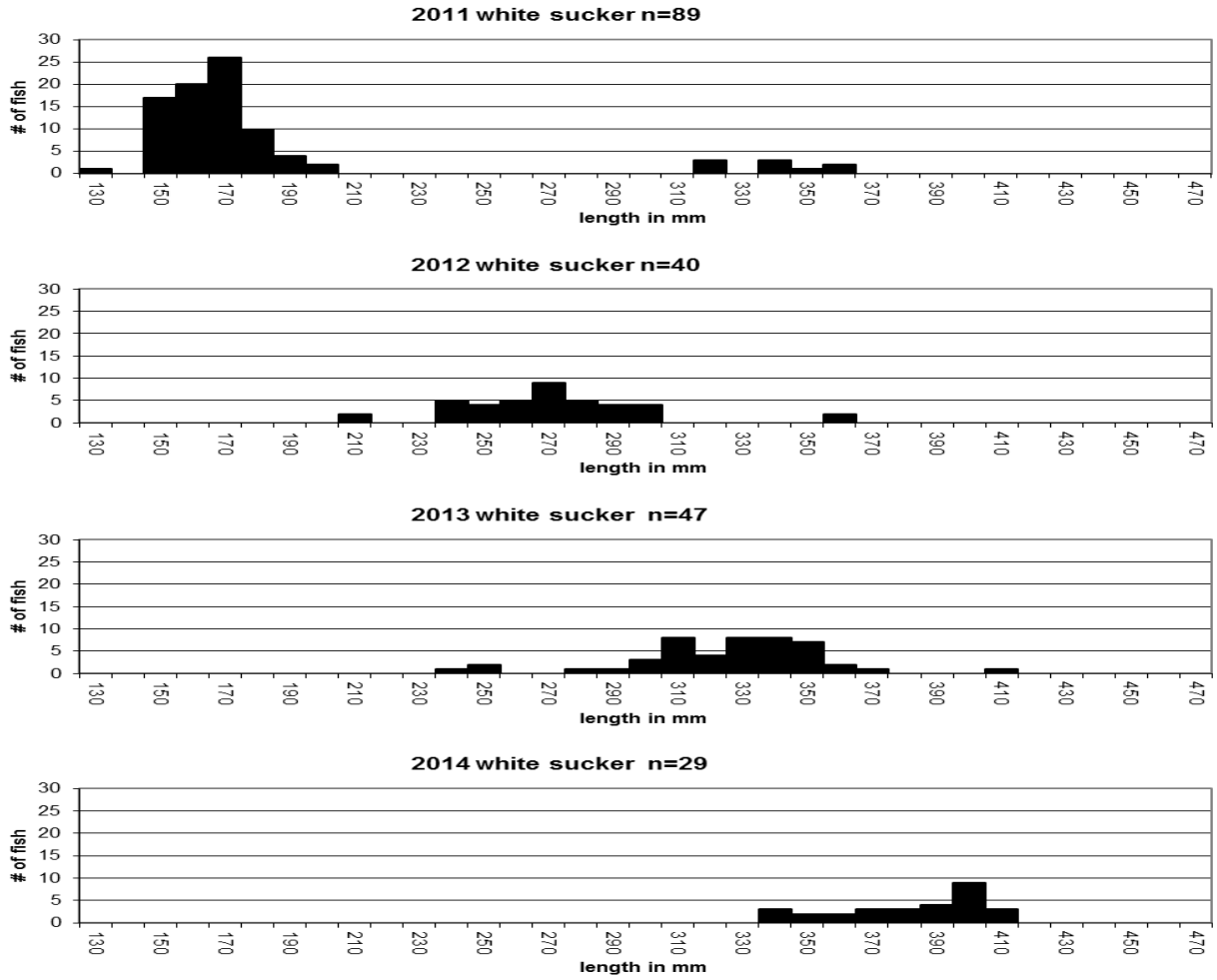

Figure 5. Length frequencies of white sucker collected from East Lemmon Lake, Perkins County, 2011-2014.

Yellow perch

The current management objective is to increase and maintain yellow perch gill-net CPUE at 25 or greater for stock-length and larger fish, and maintain PSD between 20 and 40. Last year, gill net CPUE was 54.0, this year it was 21.0 (Table 2). Stock density increased from a PSD of 22 last year to 86 this year. PSD-P was 31 compared to 0 last year. Growth was excellent well above the state and regional average (Table 4). Fish condition was also good with a *Wr*≥S of 106.3.

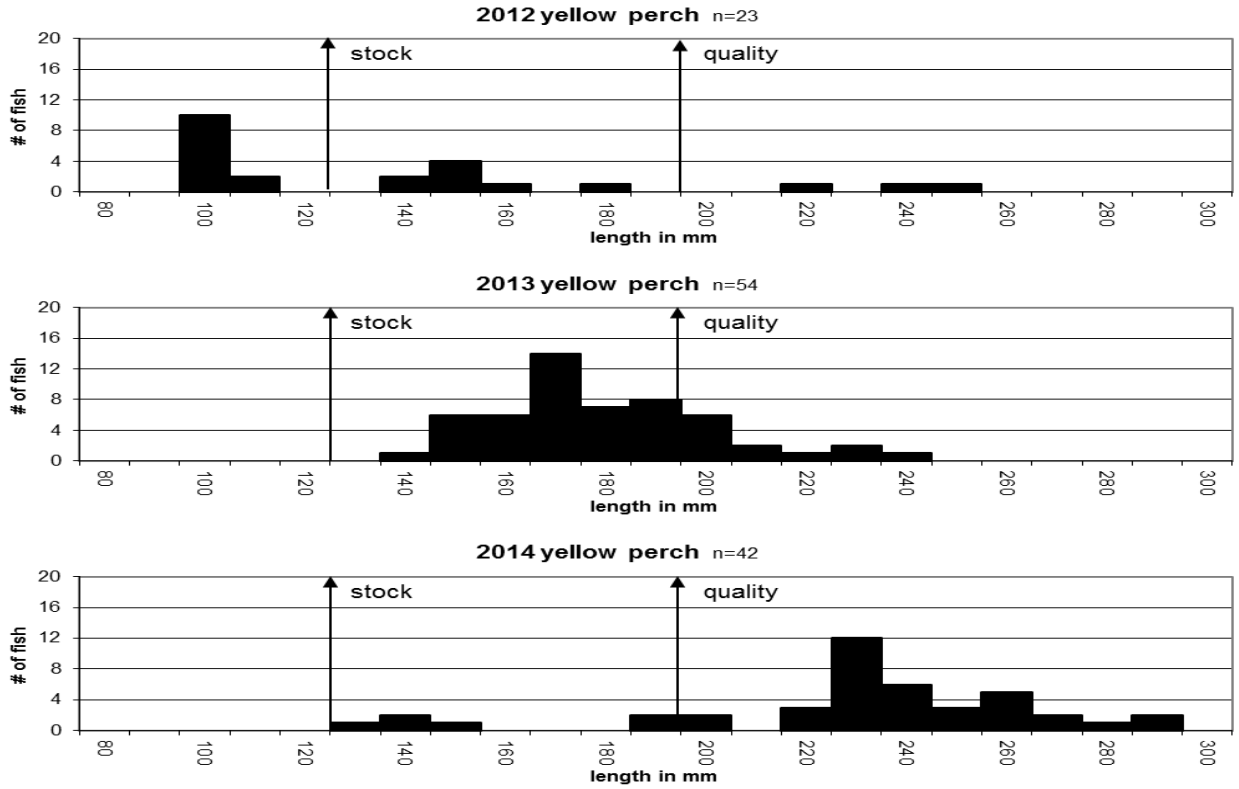

Figure 6. Length frequencies of yellow perch from East Lemmon Lake, Perkins County, 2012-2014.

Table 4**.** East Lemmon Lake yellow perch year class, age in 2014, sample size (N), mean back-calculated total length-at-age, the Region 1 mean length-at-age, and the South Dakota state-wide yellow perch mean length-at-age (Willis et al 2001). Standard errors are in parentheses.

Year Class	Age	N	1	2	3	4
2013	1	4	116			
2012	2	2	93	156		
2011	3	35	101	160	226	
2010	4	1	102	168	232	282
2014 Pop. mean (SE)		42	103 (5)	161 (3)	229 (3)	282 (0)
Region 1			70 (3)	117 (6)	158 (6)	186 (6)
South Dakota			86 (2)	145 (4)	190 (5)	220 (5)

RECOMMENDATIONS

1. Conduct a lake survey next year including electrofishing to evaluate fish populations and stocking success.

APPENDIX

Appendix A. Stocking records for East Lemmon Lake, Perkins County, 2002-2014. No fish were stocked by the Game, Fish and Parks in years not listed.

Year	Number	Species	Size
2002	13,525	Largemouth bass	Fingerling
2004	500	Yellow perch	Adult
2005	884	Tiger muskie	Fingerling
2006	500	Tiger muskie	Fingerling
2010	166,000	Northern pike	fry
	400	Yellow perch	Adult
	6,000	Largemouth bass	Fingerling
2011	40	Golden shiner	Adult
	385	Yellow perch	Adult
	7,000	Largemouth bass	Fingerling

LITERATURE CITED

Willis, D.W., D.A. Isermann, M.J. Hubers, B.A. Johnson, W.H. Miller, T.R. St. Sauver, J.S. Sorenson, E.G. Unkenholz, and G.A. Wickstrom. 2001. Growth of South Dakota Fishes: A Statewide Summary with means by region and Water Type. Special Report. South Dakota Department of Game, Fish and Parks. Pierre, South Dakota.